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EXAMINER

BOUTSIKARIS, LEONIDAS

ART UNIT PAPER NUMBER

2872

DATE MAILED: 04/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/909,661

Applicant(s)

JACOBSON, ALEXANDER

Examiner

Leo Boutsikaris

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22,26,27,30 and 31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 11,12,22,26,27,30 and 31 is/are allowed.
- 6) ☒ Claim(s) 1-4,6,10 and 13-21 is/are rejected.
- 7) ☒ Claim(s) 5 and 7-9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 January 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/3/06.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 6, 10, 13-16, 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saccomanno (US 2003/0025842) in view of Yokoyama (US 5,621,832).

Regarding claim 1, Saccomanno discloses an optical projection system (Fig. 4) comprising:

a unit 300 having a plurality of four input ports (in the line-shaded element holding the ends of the four fibers), each of the four ports coupled to a corresponding one of a plurality of four fibers e.g., 265, 290;

a plurality of collimating lenses, each of the lenses receiving a light beam from a corresponding port ([0059]);

a beamsplitter 301 coupled to the four collimating lenses to receive the light beam from each of the plurality of the collimating lenses, the beamsplitter having a common optical aperture disposed on an outer surface area to simultaneously receive the light received from each of the four lenses, on the outer surface area of the common optical aperture, from each of the collimating lenses ([0074]).

However, Saccomanno does not explicitly disclose that the beamsplitter and the collimating elements are secured inside a housing, the housing having the four ports that receive the four optical fibers. Yokoyama discloses an optical coupler device wherein four optical fibers 31a-31d are optically coupled to each other through the use of a beamsplitter 34 and corresponding collimating lenses 32a-32d, the beamsplitter and the lenses being held inside a housing 35 that comprises four ports receiving the corresponding four fibers (Fig. 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to secure the beamsplitter and collimating optical elements in the unit 300 of Saccomanno inside a housing, as taught by Yokoyama, for a compact subsystem that maintains the relative position of the components therein fixed (see lines 41-42, col. 1 in Yokoyama).

Regarding claims 2, 6, the beamsplitter 301 is a prism.

Regarding claim 10, the beamsplitter can be made from glass ([0066]).

Regarding claim 18, the four input ports are arranged in a one-dimensional array.

Regarding claims 19-20, Saccomanno in view of Yokoyama only shows the four input ports arranged in a one dimensional array, and not in a two-dimensional array. It would have been obvious to one of ordinary skill in the art at the time the invention was made to arrange the input ports in a two-dimensional array, as taught by Yokoyama, since it has been held that a mere rearrangement of element without modification of the operation of the device involves only routine skill in the art, *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950). Here, the arrangement of the input ports in a two-dimensional array would produce a more compact device with smaller input interface.

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Regarding claims 13-16, Saccomanno in view of Yokoyama discloses all the limitations of the above claims except for specifying that the collimating lenses are GRIN lenses, or the size and the material of the housing. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use GRIN lenses in Saccomanno's coupler, and make the housing from aluminum thermally matched to the beamsplitter, since Official Notice is taken that GRIN lenses are widely used to couple light from and into optical fibers, and that aluminum is used for housing optical components. GRIN lenses are advantageous because of their optimal light coupling efficiency.

Claims 3-4, 17, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saccomanno (US 2003/0025842) in view of Yokoyama (US 5,621,832) and further in view of Optics Guide 5 (Melles Griot).

Regarding claims 3-4, 21, Saccomanno in view of Yokoyama discloses all the limitations of the above claims except for teaching the use of a reflective polarizer plate or a rhombic prism beamsplitter, or a birefringent prism in place of the beamsplitter cube 301. The Optics Guide by Melles Griot shows typical polarizer beamsplitter plates, rhombic beamsplitter prisms and birefringent beamsplitter prisms used in optics (p. 13-4, 14-5 to 14-16). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a beamsplitter plate or a rhombic prism or a birefringent prism instead of a beamsplitter cube in Saccomanno's device, since all the above are art-recognized equivalent in splitting an input beam into two output beams.

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Regarding claim 17, the outer surface of the reflective polarizer plate has an anti-reflection coating disposed thereon (see p. 13-4 in Melles Griot).

Response to Applicant's Arguments

Applicant's arguments with respect to claims 1-3, 6, 10, 13-16 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

Claims 5, 7-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 11-12, 22, 26-27, 30-31 are allowed.

Claims 5, 7-9, 11-12, 22, 26-27, 30-31 are allowable over the prior art of record for at least the reason that even though the prior art discloses optical couplers comprising a non-polarizing beamsplitter having a common optical aperture receiving light from all the input/output ports, or optical couplers comprising a plurality of polarizing beamsplitters, the polarizing beamsplitters having a plurality of optical apertures receiving light from the various ports, the prior art fails to teach or reasonably suggest, regarding claims 5, 7-9, an apparatus comprising a beamsplitter having a common optical aperture disposed on an outer surface area to simultaneously receive the four light beams, on the outer surface area of the common optical aperture, wherein the beamsplitter has a coating on the inner surface to separate the S-polarized and P-polarized components of the light beam into spatially separate beams, regarding claims 11-

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12, an apparatus comprising a beamsplitter having a common optical aperture disposed on an outer surface area to simultaneously receive light from each of the plurality of collimating lenses, wherein the beamsplitter combines into the first output port, S-polarized light from the first input port with P-polarized light from the second input port, and combines into the second output port, S-polarized light from the third input port with P-polarized light from the fourth input port, regarding claim 22, an apparatus comprising a rhombic prism having a common optical aperture disposed on an outer surface area to simultaneously receive light from each of the plurality of collimating lenses, and separate the S-polarized and P-polarized components of the light beam into spatially separate beams, regarding claims 26-27, a method comprising collimating at least four light beams by a single device having a common optical aperture, reflecting a S-polarized component of each of the at least four light beams and refracting a P-polarized component of each of the at least four light beams using the single device, and regarding claims 30-31, an apparatus comprising means for receiving at least four light beams by a single device having a common optical aperture, means for reflecting a S-polarized component of each of the at least four light beams and refracting a P-polarized component of each of the at least four light beams using the single device, as set forth by the claimed combination.

Conclusion

The allowability of claims 4, 17-21, indicated in the previous Office Action, is hereby withdrawn. The examiner regrets any inconvenience caused to Applicant.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Leo Boutsikaris whose telephone number is 571-272-2308.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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April 11, 2006



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